

WHAT IS CLAIMED IS:

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1. An image processing device comprising:
setting means for setting image size change
or image region moving for a code stream of an
original image, wherein the original image is divided
10 into a plurality of regions, and respective image
data of the plurality of regions are compressed and
encoded independently of each other to form the code
stream; and

position information changing means for
15 changing position information of the plurality of
regions so that the image size change or the image
region moving can be performed on the code stream
with all or a part of contents of the original image
being maintained.

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2. The image processing device according to
25 claim 1, wherein the position information changing

means changes the position information of the plurality of regions to generate an image expanded from the original image with all of the contents of the original image being maintained.

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3. The image processing device according to claim 2, wherein an additional image region is added to the plurality of regions so that the original image can expand by the additional image region.

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4. The image processing device according to claim 1, wherein the position information changing means changes the position information of the plurality of regions to generate an image reduced from the original image with the part of the contents of the original image being maintained.

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5. The image processing device according to claim 1, wherein the position information changing means changes the position information of the plurality of regions to move a region that is among the plurality of regions, with all of or the part of the contents of the original image being maintained.

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6. The image processing device according to claim 1, further comprising code data generating means for generating code data for a blank region among the plurality of region, and adding the generated code data to the code stream, the blank region not including the contents of the original image.

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7. The image processing device according to claim 6, wherein the code data generating means provides a predetermined value to each pixel of the

blank region to generate the code data for the blank region.

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8. The image processing device according to claim 6, further comprising ground color detecting means for detecting a pixel value of a ground color part of the original image,

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wherein the code data generating means provides the detected pixel value of the ground color part to the each pixel of the blank region to generate the code data for the blank region.

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9. The image processing device according to claim 4, further comprising deleting means for deleting code data of a region that is among the plurality of regions and does not correspond to the part of the contents of the original image.

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10. The image processing device according
to claim 4, wherein the position information changing
5 means changes the position information of the
plurality of regions to exclude, from the reduced
image, a region that is among the plurality of
regions and does not correspond to the part of the
contents of the original image.

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11. The image processing device according
15 to claim 1, further comprising deleting means for
deleting a size incomplete region that is among the
plurality of regions and has an incomplete size.

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12. The image processing device according
to claim 1, further comprising size changing means
for decoding code data of a size incomplete region
25 that is among the plurality of regions and has an

incomplete size, and performing encoding again for the size incomplete region so that the size incomplete region can be changed to a size complete region having a complete size.

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13. The image processing device according to claim 1, further comprising:

significance determining means for determining whether or not an incomplete size region includes significant image data, wherein the size incomplete region is among the plurality of regions and has an incomplete size; and

size changing means for, when the significance determining means determines that the size incomplete region includes significant image data, decoding code data of the incomplete size region, and performing encoding again for the size incomplete region so that the incomplete size region can be changed to a size complete region having a complete size;

wherein when the significance determining means determines that the size incomplete region does

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not include significant image data, the position information changing means changes the position information of the plurality of regions to delete the size incomplete region.

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14. The image processing device according to claim 12, wherein the size changing means provides a predetermined pixel value to a blank part of the size complete region, the blank part not including the contents of the original image.

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15. The image processing device according to claim 13, wherein the size changing means provides a predetermined pixel value to a blank part of the size complete region, the blank part not including the contents of the original image.

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16. The image processing device according
to claim 12, further comprising ground color
detecting means for detecting a pixel value of a
5 ground color part of the original image,

wherein the size changing means provides the
detected pixel value to a blank part of the size
complete region, the blank part not including the
contents of the original image.

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17. The image processing device according
15 to claim 13, further comprising ground color
detecting means for detecting a pixel value of a
ground color part of the original image,

wherein the size changing means provides the
detected pixel value to a blank part of the size
20 complete region, the blank part not including the
contents of the original image.

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18. The image processing device according to claim 1, further comprising encoding means for compressing and encoding the original image by using a two-dimensional discrete wavelet transformation,
5 and entropy-encoding or arithmetic encoding.

10 19. The image processing device according to claim 18, wherein the encoding means compresses and encodes the original image by using a JPEG2000 algorithm or a Motion-JPEG2000 algorithm.

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20 20. The image processing device according to claim 2, wherein the setting means receives an expansion rate, and a displayed position, in the expanded image, of the contents of the original image, the expansion rate and the displayed position being specified by a user, and sets the size changing in accordance with the displayed position and the
25 expansion rate.

5 21. The image processing device according
to claim 4, wherein the setting means receives a
reduction rate, and a displayed range of the reduced
image, and the reduction rate and the displayed range
being specified by a user, and sets the size changing
10 in accordance with the reduction rate and the
displayed range.

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 22. The image processing device according
to claim 5, wherein the setting means receives a
displayed position of the moved region specified by a
user, and sets the region moving in accordance with
20 the displayed position.

25 23. The image processing device according

to claim 1, further comprising:

dividing means for dividing the original image into the plurality of regions; and

encoding means for encoding the respective
5 image data of the plurality of regions independently of each other to form the code stream,

wherein the position information changing means changes the position information for the code stream formed by the encoding means.

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24. An image forming apparatus comprising:

15 a scanner that reads an original image; and
an image processing device,

wherein the image processing device comprises:

setting means for setting image size change
20 or image region moving on a code stream of the original image, wherein the original image is divided into a plurality of regions, and respective image data of the plurality of regions are compressed and encoded independently of each other to form the code
25 stream; and

position information changing means for
changing position information of the plurality of
regions so that the image size change or the image
region moving can be performed on the code stream to
5 form a new code stream with all or a part of contents
of the original image being maintained,

and the image forming apparatus further
comprises a printer engine that forms the original
image or a changed image on paper, based on the code
10 stream or the new code stream.

15 25. An image processing program comprising:
a program code of setting image size change
or image region moving for a code stream of an
original image, the code stream being constituted by
a plurality of regions of the original image; and

20 a program code of changing position
information of the plurality of regions with all of
or a part of contents of the original image being
maintained to perform the image size change or the
image region moving.

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26. The image processing program according
5 to claim 25, wherein the program code of changing the
position information of the plurality of regions to
generate an image expanded from the original image
with all of the contents of the original image.

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27. The image processing program according
to claim 25, wherein the program code of changing
15 changes the position information of the plurality of
regions to generate an image reduced from the
original image, the reduced image including the part
of the contents of the original image.

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28. The image processing program according
to claim 27, further comprising a program code of
25 deleting, from the original image, a region that is

among the plurality of regions and does not correspond to the part of the contents of the original image.

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29. The image processing program according to claim 27, wherein the program code of changing
10 changes the position information of the plurality of regions to excludes, from the reduced image, a region that is among the plurality of regions and does not correspond to the part of the contents of the original image.

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30. The image processing program according to claim 25, wherein the program code of changing
20 changes the position information of the plurality of regions to move a region that is among the plurality of regions with all of or the part of the contents of the original image being maintained.

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31. The image processing program according
5 to claim 25, further comprising a program code of
generating code data of a blank region that is among
the plurality of regions and does not includes the
contents of the original image.

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32. The image processing program according
to claim 31, wherein the program code of generating
15 provides a predetermined value to each pixel of the
blank region to generate the code data for the blank
region.

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33. The image processing program according
to claim 31, further comprising a program code of
detecting a pixel value of a ground color part of the
25 original image,

wherein the program code of generating provides the detected pixel value to each pixel of the blank region to generate the code data for the blank region.

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34. The image processing program according to claim 25, further comprising a program code of deleting, from the original image, a size incomplete region that is among the plurality of regions and has an incomplete size.

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35. The image processing program according to claim 25, further comprising a size changing program code of decoding code data of a size incomplete region that is among the plurality of regions and has an incomplete size, and performing encoding again for the size incomplete region so that the size incomplete region can be changed to a size complete region having a complete size.

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5 36. The image processing program according
to claim 25, further comprising a program code of
determining whether or not a size incomplete region
includes significant image data, wherein the size
incomplete region is among the plurality of regions
10 and has an incomplete size; and

a size changing program code of, when it is
determined that the size incomplete region includes
significant image data, decoding code data of the
size incomplete region, and performing encoding again
15 for the size incomplete region so that the size
incomplete region can be changed to a size complete
region having a complete size,

wherein when it is determined that the size
incomplete region does not include significant image
20 data, the program code of changing changes the
position information of the plurality regions to
delete the size incomplete region from the original
image.

37. The program code according to claim 35,
further comprising a program code of providing a
5 predetermined pixel vale to a blank part of the size
complete region, the blank part not including the
contents of the original image.

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38. The image processing program according
to claim 36, wherein the size changing program code
provides a predetermined pixel vale to a blank part
15 of the size complete region, the blank part not
including the contents of the original image.

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39. The image processing program according
to claim 35, further comprising a program code of
detecting a pixel value of a ground color part of the
original image,
25 wherein the size changing program code

provides the detected pixel value to a blank part of the size complete region, the blank part not including the contents of the original image.

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40. The image processing program according to claim 36, further comprising a program code of detecting a pixel value of a ground color part of the original image,

wherein the size changing program code provides the detected pixel value to a blank part of the size complete region, the blank part not including the contents of the original image.

20 41. The image processing program according to claim 25, further comprising a program code of compressing and encoding image data of the original image by using two-dimensional discrete wavelet transformation, and entropy-encoding or arithmetic
25 encoding so that the code stream can be constituted

by the compressed and encoded image data of the original image.

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42. The image processing program according to claim 41, wherein the program code of compressing and encoding encodes the image data of the original
10 image by using a JPEG2000 algorithm or a Motion-JPEG2000 algorithm.

43. The image processing program according to claim 26, wherein the program code of changing
15 sets the image size change in accordance with an expansion rate and a displayed position of the expanded image that are specified by a user.

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44. The image processing program according to claim 27, wherein the program code of changing sets the image size change in accordance with a
25 reduction rate and a range of the reduced image that

are specified by a user.

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45. The image processing program according to claim 30, wherein the program code of changing sets the image size change in accordance with a displayed position of the moved region specified by a user.

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46. The image processing program according to claim 25, further comprising:

a program code of dividing the original image into the plurality of regions; and

a program code of compressing and encoding respective image data of the plurality of regions independent of each other to form the code stream.

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47. The image processing program according to claim 26, further comprising a program code of providing an additional region to the plurality of regions so that the original image can be expanded by
5 the additional region,

wherein the program code of changing changes the position information of the plurality of regions by taking the additional region into account.

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48. A storing medium that stores an image processing program comprising:

15 a program code of setting image size change or image region moving for a code stream of an original image, the code stream being constituted by a plurality of regions of the original image; and

a program code of changing position
20 information of the plurality of regions with all of or a part of contents of the original image being maintained to perform the image size change or the image region moving.

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